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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/644,010	08/20/2003	Yasuharu Hourai	107439-00091	4878

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EXAMINER

HOANG, ANN THI

ART UNIT	PAPER NUMBER
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2836

DATE MAILED: 10/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/644,010	Applicant(s) HOURAI, YASUHARU	
	Examiner Ann T. Hoang	Art Unit 2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 20 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 August 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date: _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>8/20/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. Figure 4 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities: On page 9, line 18, the FET should be referenced with the number 152.

Appropriate correction is required.

Claim Objections

3. Claim 5 recites the limitation "the inter-terminal voltage" in line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-2 are rejected under 35 U.S.C. 102(b) as being anticipated by Murata et al. (US 5,953,198).

Regarding claim 1, Murata et al. discloses an excitation control circuit comprising: a driving circuit 1 for driving a coil 3 of a solenoid in response to a pulse signal supplied from an external device 16; a counter-electromotive force absorbing circuit 6, inserted in a path of a return current of coil 3, for absorbing counter-electromotive force produced by coil 3; and a return current circuit 5, connected in parallel to the counter-electromotive force absorbing circuit 6, for intermittently bypassing the return current. When driving circuit 1 is not energizing coil 3, a counter-electromotive force generated in coil 3 can exit coil 3 and flow through either counter-electromotive force absorbing circuit 6, which is a Zener diode, or through the terminals of return current circuit 5, a transistor. Counter-electromotive force absorbing circuit 6 and return current circuit 5 are connected in parallel so that the counter-electromotive force current coming from coil 3 takes one path at some times, and takes the other path at other times, this being determined by the delay circuit 11 and photocoupler 8. See Fig. 1.

Regarding claim 2, Murata et al. discloses return current circuit 5 to have a first transistor, whose current path is connected between a positive electrode and a negative electrode of coil 3, wherein first transistor 5 is switched on according to a signal for defining the timing of bypassing the return current. Photocoupler 8, driven by delay circuit 11, provides the signal to switch on first transistor 5. See Fig. 1; column 8, lines 66-67; and column 9, lines 1-7.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schuhbauer et al. (US 5,933,312) in view of Murata et al. (US 5,953,198). These are separate and alternative rejections to the above rejections on claims 1-2.

Regarding claim 1, Schuhbauer et al. discloses an excitation control circuit comprising: a driving circuit 18 for driving a coil 1 of a solenoid; a counter-electromotive force absorbing circuit 3, inserted in a path of a return current of coil 1, for absorbing counter-electromotive force produced by the coil; and a return current circuit (2, 4) connected to counter-electromotive force absorbing circuit 3, for intermittently bypassing the return current. When driving circuit 18 is not energizing coil 1, a counter-electromotive force generated in coil 1 can be absorbed by either counter-electromotive

force absorbing circuit 3, which is a non-linear resistor, or by return current circuit (2, 4), which comprises a free-wheeling diode 2 and free-wheeling transistor 4. Free-wheeling transistor 4 and counter-electromotive force absorbing circuit (non-linear resistor) 3 are connected in parallel so that the counter-electromotive force current coming from coil 1 takes one path at some times, and takes the other path at other times, this being determined by the voltage in the coil. See abstract and figure. Schuhbauer et al. does not disclose that driver circuit 18 drives coil 1 in response to a pulse signal supplied from an external device.

However, it is common and well known in the art that driver circuits for driving coils can operate according to a pulse signal, as Murata et al. discloses a driving circuit (1, 16) for driving a coil 3 in response to a pulse signal. See abstract and Fig. 1. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the driving circuit of Murata et al. in the excitation control circuit of Schuhbauer et al. in order to excite the coil in a chopping manner.

Regarding claim 2, Schuhbauer et al. discloses that return current circuit (2, 4) has a first transistor 4, whose current path is connected between a positive electrode and a negative electrode of coil 1, wherein first transistor 4 is switched on according to a signal for defining the timing of bypassing the return current. Variants of a resistor 7 and capacitor 6 establish the timing of the switching of first transistor 4. See figure and column 3, lines 13-18.

8. Claims 3-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schuhbauer et al. (US 5,933,312) in view of Murata et al. (US 5,953,198) as applied to claims 1-2 above, and further in view of Fischer et al. (US 6,140,717).

Regarding claim 3, Schuhbauer et al. does not disclose counter-electromotive force absorbing circuit 3 to include a transistor or a control system for switching on the transistor. Murata et al. discloses a counter-electromotive force absorbing circuit 4 that includes a transistor 5, whose current path is connected between a positive electrode and a negative electrode of coil 3, and a control system (8, 11) for switching on transistor 5. Murata et al. does not disclose an inter-terminal voltage of transistor 5 in its current path to be a determining factor in the switching of transistor 5.

However, Fischer et al. discloses a counter-electromotive force absorbing circuit that includes a transistor T1 and a control system (UZ1, DZ1, R1) for switching on transistor T1 when an inter-terminal voltage of transistor T1 in its current path exceeds a predetermined value. In the circuit of Fischer et al., the counter-electromotive force generated in a coil L2 is absorbed by another coil L1 when coil L1 is grounded via transistor T1. Transistor T1 is switched on when a current path is established from node C to the gate of transistor T1 through diodes UZ1 and DZ1, thereby establishing a predetermined inter-terminal voltage in transistor T1. See abstract and Fig. 1. It would have been obvious to one of ordinary skill in the art at the time of the invention to make the counter-electromotive force absorbing circuit of Schuhbauer et al. a transistor circuit, such as that of Murata et al., and control the switching of the transistor based on its inter-terminal voltage, as done by Fischer et al., in order to selectively control the

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ON/OFF state of the transistor based directly on the amount of counter-electromotive force ready to flow through the transistor from the coil. Additionally, the resistor and diodes used by Fischer et al. would provide an inexpensive means for detecting a high voltage resulting from the counter-electromotive force generated by the coil and switching on the transistor to absorb the counter-electromotive force.

Claim 4 is rejected on the same basis as that of claim 3 (see above rejection).

Regarding claim 5, Schuhbauer et al. discloses that first transistor 4 can be any sort of switching transistor type and depicts it as a field effect transistor having an inter-terminal voltage between a source and a drain of the field effect transistor. See the figure and column 3, lines 29-31.

Regarding claim 6, Murata et al. discloses that transistor 5 can be a field effect transistor. See column 14, line 63. Fischer et al. discloses transistor T1 to be a field effect transistor. The inter-terminal voltage of transistor T1 on which the switching of transistor T1 is based is a voltage between the source and the drain of the field effect transistor T1. See Fig. 1 and column 2, lines 57-59.

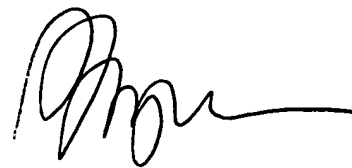
Claim 7 is rejected on the same basis as that of claim 6 (see above rejection).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ann T. Hoang, whose telephone number is 571-272-2724. The examiner can normally be reached Mondays through Fridays, 8:00 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus, can be reached at 571-272-2058. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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